

WHAT IS CLAIMED IS:

1. A method for producing a set of progeny polypeptides from a template polypeptide, wherein the progeny polypeptides contain a non-stochastic range of single amino acid substitutions represented at each amino acid position, the method comprising:
 - a) subjecting a codon-containing template polynucleotide to polymerase-based amplification using a 64-fold degenerate oligonucleotide for each codon to be mutagenized, wherein each of said 64-fold degenerate oligonucleotides is comprised of a first homologous sequence and a degenerate N, N, N triplet sequence, so as to generate a set of progeny polynucleotides; and
 - b) subjecting said set of progeny polynucleotides to clonal amplification such that polypeptides encoded by the progeny polynucleotides are expressed;whereby, said method provides a means for generating all 20 amino acid changes at each amino acid site along a parental polypeptide template.